**Author’s Affiliation**

Rodolfo Garau

ERC Project EaryModernCosmology

Università Ca’ Foscari, Venice

**Title**

Montanari, Geminiano

**Dates and places of birth and death**

(Born: 1633, Modena / Died: 1687, Padua)

**Abstract**

Geminiano Montanari was an Italian mathematician and astronomer. He is mostly remembered for the discovery of the star Algol of the constellation of Perseus, and his cometary observation of 1667, also quoted by Newton. Trained as a lawyer in Florence, he then devoted himself to the study of physics and mathematics. He started his career as an astronomical observer at the observatory of Panzano. From 1664 on, he held the professorship of mathematics in Bologna, and then of astronomy and meteorology in Padua. He wrote on diverse topics, ranging from ballistics, hydraulics, astronomy, and monetary theory. Recent scholarship has also emphasized is epistemological reflections on the experimental method as an example of theorization of the experimental practice in continental Europe.

**Biography**

Montanari was born on June 1, 1633, in Modena. He moved to Florence in 1653, where he studied the law under the direction of the lawyer Iacopo Federichi. In 1656, he moved to Salzburg where he obtained a bi-national doctorate in law. He then studied mathematics in Vienna under the supervision of the Florentine mathematician Paolo del Buono, a disciple of Galileo’s. In 1657 and 1658, he visited the mines of the provinces (and especially of Hungary) under mandate of the emperor. In the same year he came back to Florence where he started his legal practice. In 1661 is in Ferrara at the court of Alfonso IV d’Este (1634-1662), where he held the title of ducal philosopher and mathematician. At his behest, he assisted to astronomical observations and performed calculations of ephemerides, then published with the marquess Cornelio Malvasia (1603-1664). After the death of Alfonso, he moved to Malvasia’s villa in Panzano, endowed with an observatory. With Malvasia, Montanari performed astronomical observations during the years 1662 and 1663, and contributes the publication of Ephemerides Novissimae (1662). Though Malvasia, he meets Domenico Cassini and Giovanni Battista Riccioli in Bologna. At the death of Malvasia in 1664, he obtained the chair in mathematics in Bologna, which he held for 14 years. He supports the institution of an observatory and collaborates with Cassini, now in Paris. With Carlo Antonio Sampieri, he established the Accademia della Treccia (affiliated with the Accademica del Cimento), leading research on fluid dynamics. Through the Accademia della Treccia, he also enters in contact with the Royal Society of London. In the ‘70s, he is involved in a public polemic with the Livornese logician Donato Rossetti (1633-1686) on the nature of tempered glasses. In 1678, he was called by the Venetian senate to read at the University of Padua, where a chair of astronomy and meteorology was established specifically for him. After six years in Padua, he obtained the ricondotta from the Venetian senate. During his stay in Venice, he always also engaged in works of public utility – especially connected with mining, hydraulics, and coinage. Of overweight constitution, and weighed down by the frequent trips that he had undertake to supervise public hydraulic works, he was caught by a stroke in 1783, losing the sight of one eye and suffering impediments in speech and ambulation. Having to stop his services as an engineer, he drafts treatises on the water and money, which will be published posthumously. Also *Le forze d’Eolo; dialogo fisico-matematico sopra gli effetti del vortice* will be published in 1694. He dies on October 13 1687 in Padua of a recrudescence of his disease.

**Heritage and rupture with the tradition**

Montanari educated by Paolo del Buono, a pupil of Galileo’s. In this regard, he followed this example of a scholar who was prone to direct observation (especially astronomical) and could apply his mathematical knowledge to different fields – from astronomy to hydraulic, from money theory to mechanics – as well as to the solution of practical engineering problems – from the construction of mines to hydraulic public works. Proof of this are for instance his publication on ballistics (*Manualetto de bombisti, ouero Ristretto delle avvertenze più necessarie per ben maneggiare i mortari: aggiontovi le tavole delle inclinazioni di essi mortari per fari i tiri giusti: calcolate secondo la dottrino del Galileo, e d'altri matematici, e ridotte ad uso facile, da servirsene senza far conti*, 1682), which were designed for practical use. At the same time, Montanari has been recognized as part of a broader intellectual community that theorized the methodology of the experimental practice and actively pursued the public good as the ultimate goal of the scientific inquiry (see Vanzo 2016). This is also testified by his activity as founder of institutions: in addition the Accademia della Treccia, Montanari also favoured the establishment of a number of astronomical observatories, in Bologna and Veneto. His public commitment is also testified by by his life-long engagement against astrology, that culminated in the publication of *L'astrologia convinta di falso col mezzo di nuove esperienze* (1685)

**Innovative and original aspects**

Montanari is now mostly remembered for his observation of the hat the second-brightest star (called Algol) in the constellation of Perseus varied in brightness (*Il Discorso astronomico sopra la sparizione d’alcune stelle*, 1671). This publication had not only an observational goal, but also a theoretical one: it meant to disprove the Aristotelian thesis of the incorruptibility of heavens. His early publications dealt especially with the compilation of ephemerides (Malvasia et al. 1662) and astronomical observations (G. Montanari and Ferroni 1665). *Pensieri fisico-matematici* (1667) collected a series of experiments and observations conducted at the Accademia della Treccia, especially addressed to the study of the phenomena of capillarity. Montanari’s experiments are underpinned by a corpuscularian understanding of matter. *Pensieri fisico-matematici* (1667) ensued a harsh polemic with Donato Rossetti (1633-1686), a pupil of Borrelli’s and then professor of logic in Pisa (and then in Turin). While Montanari explained the problem of capillarity through the concept of viscosity, Rossetti argued that atoms had the power to attract and repulse each other in the vacuum. The polemic later involved other issues, as for instance the question of equilibrium (*Prostasi fisico-matematica*, 1669), of tempered glasses (*Speculazioni fisiche*, 1671). Gomez Lopez (1997) has framed this controversy as the example of the fragmented positions sustained by the Galilean school in seventeenth century Italy.

**Impact and legacy**

Montanari had surely a great impact in the establishment of an experimental tradition in Italy during the post-Galilean period. His activity as an astronomical observer was known outside the Italian peninsula, to the extent that his observation of the great comet of 1680 (*Copia di lettera scritta all' Illmo. Signore Antonio Magliabecchi: bibliotecario del serenissimo Gran Duca di Toscana, sopra i moti, i le apparenze della comet ultimamente apparsa sul fine di Novembre 1680*) is quoted for two times in Newton’s *Principia mathematica* (1687). A crater on the Moon is named after Montanari.

**Cross-References**

Galileo Galilei; Donato Rossetti; Alfonso Borelli; Giovanni Battista Riccioli; Domenico Cassini

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